

220036US-0XPCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :

KIYOSHI FUDA ET AL. :

SERIAL NO: NEW U.S. PCT APPLN. : ATTN: APPLICATION BRANCH  
(Based on PCT/JP01/06452)

FILED: HERewith :

FOR: TREATMENT PROCESS AND  
TREATMENT MATERIAL OF  
FLUORINE COMPOUND

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS  
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-application as follows.

IN THE CLAIMS

Please amend the claims as shown in the marked-up copy following this amendment to read as follows.

3. (Amended) The treatment process of the solution containing the fluorine compound according to claim 1, the process further comprising,  
adjusting pH of the solution to more than 4,  
precipitating the layered double hydroxide having the fluorine compound between layers.

4. (Amended) The treatment process of the solution containing the fluorine compound according to claim 1, the process further comprising,  
adding an alkali to the solution to adjust pH from 4 to 12,

adding divalent and trivalent metal salts to said solution precipitating the layered double hydroxide having the fluorine compound between layers.

5. (Amended) The treatment process of the solution containing the fluorine compound according to claim 1,

wherein the divalent metal salt is a salt of magnesium, calcium, zinc, nickel, copper, manganese (divalent), or cobalt (divalent), and the trivalent metal salt is a salt of aluminum, iron, chromium, manganese (trivalent), cobalt (trivalent), potassium, lanthanum, or scandium.

6. (Amended) The treatment process of the solution containing the fluorine compound according to claim 1,

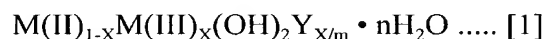
wherein the divalent and the trivalent metal salts are chlorides.

7. (Amended) The treatment process of the solution containing the fluorine compound according to claim 1,

wherein the fluorine compound is carboxylic acid or sulfonic acid having the fluorocarbon chain, in which the number of carbon is more than 5.

8. (Amended) The treatment process of the solution containing the fluorine compound according to claim 1,

wherein the layered double hydroxide having the fluorine compound between layers is shown in the following formula [1].



where, Y is an anion having valence number m of the fluorine compound having the fluorocarbon chain, M(II) is a divalent metal ion, M(III) is a trivalent metal ion, X is 0.1 to 0.5, and n is 0 or positive integer.

9. (Amended) A treatment process for recovering for fluorine compound and its salts, the process comprising,

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precipitating the layered double hydroxide by the treatment process according to claim 1,  
recovering the solid part by the solid-liquid separation,  
dissolving said recovered solid part in a mineral acid to recover the separated fluorine compound or its salts, or  
heating said mineral acid dissolving the recovered solid part,  
putting quietly to separate an oil layer, and  
taking out the oil layer to recover the fluorine compound and its salts.

10. (Amended) A treatment process for recovering a fluorine compound and its salts,  
the process comprising,

precipitating the layered double hydroxide by the treatment process according to claim 1,

recovering the solid part by the solid-liquid separation,

dispersing the recovered solid part to an organic solvent, and

filtering an insoluble part from said solvent.

Please add the following new claims.

12. (New) The treatment process of the solution containing the fluorine compound according to claim 2, the process further comprising,

adjusting pH of the solution to more than 4,

precipitating the layered double hydroxide having the fluorine compound between layers.

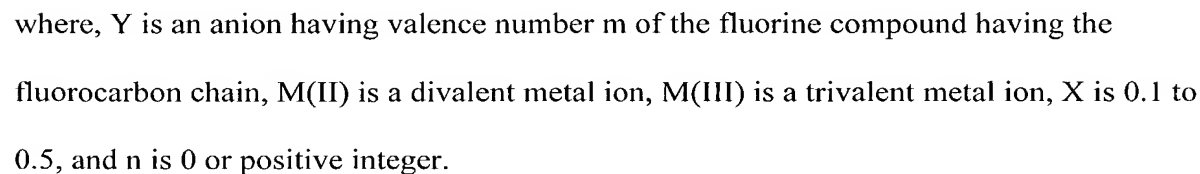
13. (New) The treatment process of the solution containing the fluorine compound according to claim 2, the process further comprising,

wherein the divalent metal salt is a salt of magnesium, calcium, zinc, nickel, copper, manganese (divalent), or cobalt (divalent), and the trivalent metal salt is a salt of aluminum, iron, chromium, manganese (trivalent), cobalt (trivalent), potassium, lanthanum, or scandium.

wherein the divalent and the trivalent metal salts are chlorides.

wherein the fluorine compound is carboxylic acid of sulfonic acid having the fluorocarbon chain, in which the number of carbon is more than 5.

wherein the layered double hydroxide having the fluorine compound between layers is shown in the following formula [1].



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REMARKS

Claims 3-10 have been amended to remove multiple dependencies. Claims 12-19 are new claims. Support for the new claims is found in the original claims. No new matter is added. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

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<b>Marked-Up Copy</b> Serial No: <hr/> Amendment Filed on: <u>3-20-2002</u>
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IN THE CLAIMS

Please amend the claims as follows.

--3. (Amended) The treatment process of the solution containing the fluorine compound according to [claims [1] or [2]] claim 1, the process further comprising, adjusting pH of the solution to more than 4, precipitating the layered double hydroxide having the fluorine compound between layers.

4. (Amended) The treatment process of the solution containing the fluorine compound according to [claims [1] or [2]] claim 1, the process further comprising, adding an alkali to the solution to adjust pH from 4 to 12, adding divalent and trivalent metal salts to said solution precipitating the layered double hydroxide having the fluorine compound between layers.

5. (Amended) The treatment process of the solution containing the fluorine compound according to [any one of claims [1] to [4]] claim 1, wherein the divalent metal salt is a salt of magnesium, calcium, zinc, nickel, copper, manganese (divalent), or cobalt (divalent), and the trivalent metal salt is a salt of aluminum, iron, chromium, manganese (trivalent), cobalt (trivalent), potassium, lanthanum, or scandium.

6. (Amended) The treatment process of the solution containing the fluorine compound according to [any one of claims [1] to [5]] claim 1,

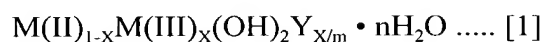
wherein the divalent and the trivalent metal salts are chlorides.

7. (Amended) The treatment process of the solution containing the fluorine compound according to [any one of claims [1] to [6]] claim 1,

wherein the fluorine compound is carboxylic acid of sulfonic acid having the fluorocarbon chain, in which the number of carbon is more than 5.

8. (Amended) The treatment process of the solution containing the fluorine compound according to [any one of claims [1] to [7]] claim 1,

wherein the layered double hydroxide having the fluorine compound between layers is shown in the following formula [1].



where, Y is an anion having valence number m of the fluorine compound having the fluorocarbon chain, M(II) is a divalent metal ion, M(III) is a trivalent metal ion, X is 0.1 to 0.5, and n is 0 or positive integer.

9. (Amended) A treatment process for recovering for fluorine compound and its salts, the process comprising,

precipitating the layered double hydroxide by the treatment process according to [any one of claims [1] to [7]] claim 1,

recovering the solid part by the solid-liquid separation,

dissolving said recovered solid part in a mineral acid to recover the separated fluorine compound or its salts, or

heating said mineral acid dissolving the recovered solid part,

putting quietly to separate an oil layer, and

taking out the oil layer to recover the fluorine compound and its salts.



